OMEX II Digital Bathymetry Data

Introduction

The OMEX II CD-ROM bathymetric data set was derived from the swath bathymetry survey at the start of the project (cruise CD105A). The swath survey did not reach the top of the slope. Consequently, a 200-metre contour, based on conventional echo sounder data from later cruises, has been merged into the contour data set.

Data Products

There are two data products contained in the CD-ROM 'bathymetry' directory, namely a gridded data set and a digital contour data set. There are three data files:

Omex2_grid.asc	Gridded data in **BODC grid format**
Omex2_ctr.asc	Contour data in **BODC contour format**
Omex2_ctr.dxf	Contour data in standard DXF format

Data Preparation Procedures

Field Data

The primary bathymetry data used to create this data set was collected during RRS Charles Darwin cruise **CD105A**, between 29 May and 9 June 1997. The data were collected using a Simrad EM12S-120 Multibeam echo-sounder system running with the 81 beams set for equidistant horizontal range. The ship's position was by differential GPS (with the addition of Real Time Computing Messages) giving positioning accuracy estimated at better than 5m. Subsequent processing, based on a measured sound velocity profile, converted the depth values to corrected metres. Erroneous data were removed onboard ship using Simrad's data processing software.

Additional sounding data, for the 200-metre contour were collected using the standard EA500 scientific echo sounder during cruises CD105B, CD110A, CD110A, CD114A, CD114B and CD66. The data were corrected for sound velocity variations using software based on Carter's Tables.

Gridded Data Set Generation

The gridded data set was generated by BODC according to the following grid specifications:

Grid type: Spheroidal

Grid origin: 43° 5'N, 10° 5'W

Grid nodes: Intervals of 5'' latitude by 5'' longitude, with depths as spot values at the node points

Grid area: 41° 43'N - 43° 5'N; 10° 5'W - 9° 20'W

The gridding work was carried out using Golden Software's 'Surfer' software. The gridding method used was Kriging using a quadrant search method to interpolate the grid node values. This was achieved by dividing the area around each node into four sectors. To determine the grid node value up to six of the nearest data points in each quadrant were examined. If each of the quadrants was found to be empty then the grid node was assigned a null value.

To remove any small-scale 'noise' from the data set, the gridded data were smoothed using Surfer's matrix smoothing software.

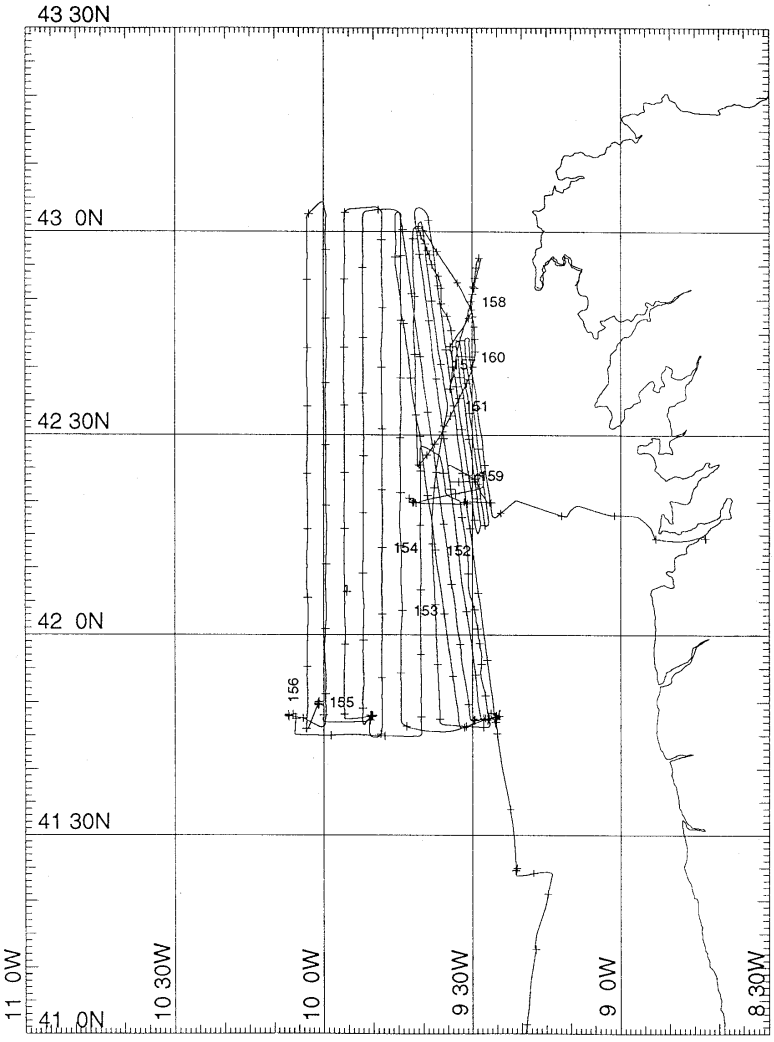
Contour Data Set Generation

Digital contours at 50m intervals from 200m were generated from the gridded data set using the GMT contouring software. The resulting data set has been **plotted** at 100m intervals over a shaded background generated from the gridded data.

The 200m contour was generated by interpolation of the **soundings data set**, digitised and merged with the contours generated from the gridded data.

The digital contour vectors have been written to the CD-ROM in standard DXF format and in **BODC Contour format**.

Charles Darwin CD105A Cruise Track



BODC Grid File Format

The data are stored in an ASCII file, including standard operating system record terminators at the end of each line (LF for UNIX, CRLF for DOS). The first line of the file gives the data area co-ordinates, i.e. the longitude and latitude limits of the grid file, (XMIN, XMAX, YMIN, YMAX), with the convention that west and south are negative, east and north are positive. This is followed by the number of rows, (IROW) and the number of columns, (ICOLUMN), in the grid.

The remainder of the records in the file contain the grid point data values, with 10 data values per line, (except the last line which has 5 values only).

The record format description and feature coding information are given below:

Each record is made up of 80 bytes and is coded as follows:

Header record: XMIN, XMAX, YMIN, YMAX, IROW, ICOLUMN in the format (2(F10.6,1X),2(F9.6,1X),2(I3,1X),30X)

Data Record: 10 grid point data values in the format (10(F7.1,1X)) (lines 2-53289)

Data Record: 5 grid point data values in the format (5(F7.1,1X),40X) (line 53290)

The grid point data values are coded as follows:

Grid points containing bathymetry data: depth value given in metres

Null or blanked grid points : -9999.9

The data records which follow the header record start at XMIN, YMAX, (10° 5'W, 43° 5'N) and begin a sequence of data values stored at 5'' longitude intervals. The data values are read from left to right across each record. Once the sequence of values at the given latitude is completed, i.e. ICOLUMN values, the latitude is decreased by 5'' and a new sequence of values is started. This process is continued for IROW separate latitude values with the last data value being at the grid point XMAX,YMIN, (9° 20'W, 41° 43'N).

To illustrate the file format description described above the following is a listing of part of an example data file:

```
-10.083333 -9.333333 41.716667 43.083332 985 541                                  - Header
-9999.9 -9999.9 3217.2 3215.3 3215.0 3216.1 3217.7 3217.1 3219.6 3218.4   - Line 2
3214.9  3211.4 3209.2 3208.7 3207.9 3206.4 3204.5 3203.8 3201.9 3201.8    - Line 3
3198.2  3195.6 3193.3 3189.8 3187.1 3184.8 3182.2 3179.2 3177.1 3175.9    - Line 4
```

The depth value given by the 5th number in line 2 of the above example data file, i.e. 3215.0 metres, would be in row 1 column 5 of the grid file and its geographic position would be 10° 4’ 40’’W; 43° 5’N.

BODC Contour File Format

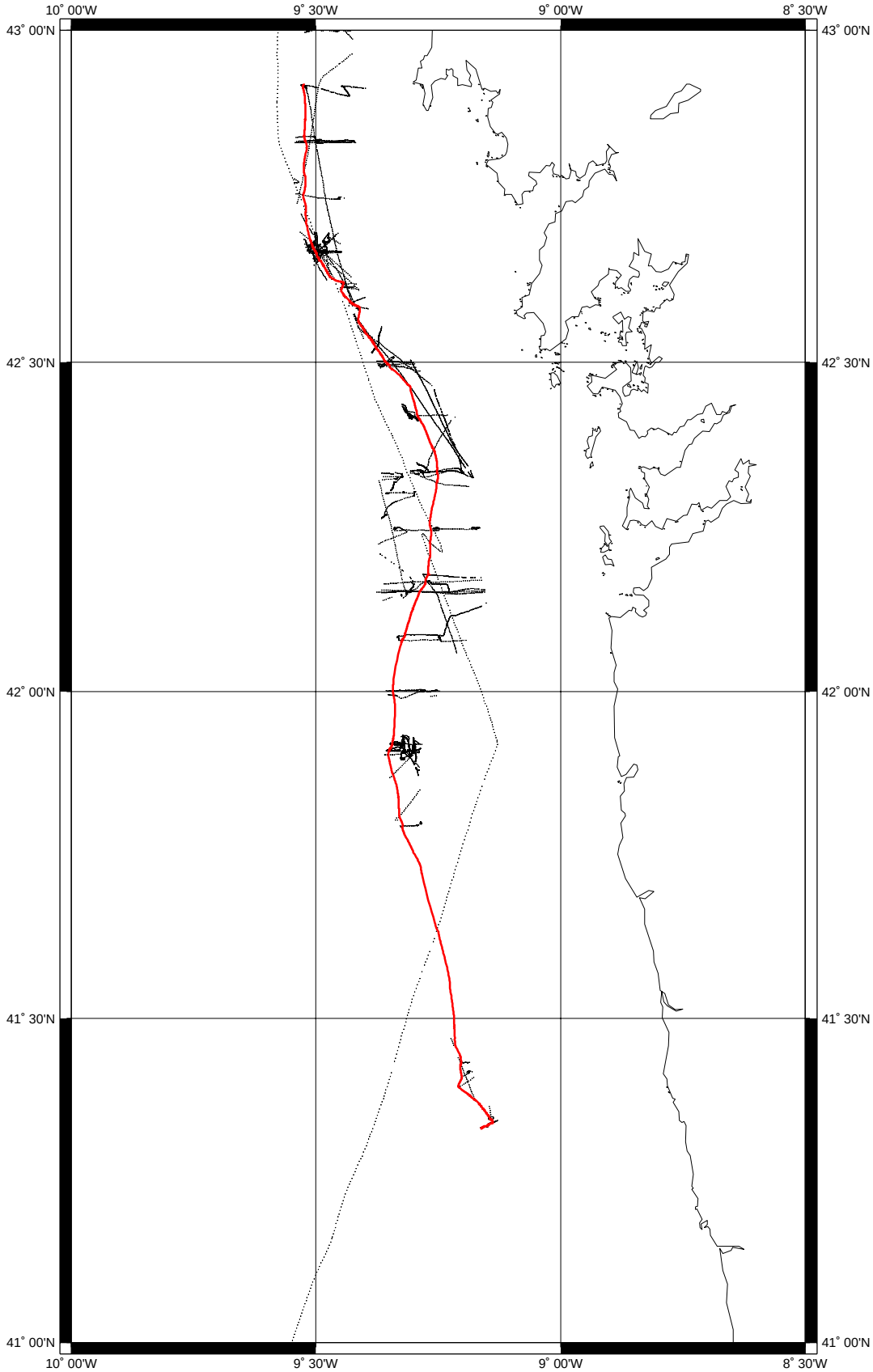
The data file consists of a number of labelled vector streams relating to bathymetric contours.

Each vector stream is preceded by a header record containing a feature code ‘ICODE’ giving the bathymetric contour depth in corrected metres and a count ‘ICOUNT’ of the number of succeeding co-ordinate pairs making up the vector. Each co-ordinate pair is stored in a record with geographic longitude ‘ALONG’ and latitude ‘ALAT’ each expressed in decimal degrees with the convention that west and south are negative and east and north are positive.

Each record is made up of 20 bytes (plus an operating system record terminator) as follows:

Header record: ICODE, ICOUNT in the format (I6,1X,I6,6X)
Co-ordinate pair record: ALONG, ALAT in the format (F9.4,1X,F9.4)

200-metre Contour Data Set



The 200m bathymetric contour

Position of sounding points used to define the 200m bathymetric contour

Bathymetry of the OMEXII-II Study Area